THE ENIGMA OF THE RETINA REFLEX

by Chris Dowden

Figure 1

Nearly 22 years have passed since Kodak produced their first Retina Reflex. Nevertheless, a large number of photographers still use Retina Reflex cameras regularly. These photographers like the top-quality photos produced by the Retina and don't see any reason to replace a good camera with a more recent and gadget-laden SLR which won't take any better pictures.

Kodak produced four models of the Retina Reflex camera in Germany. The first model was called the Retina Reflex, the second the Retina Reflex S, the third the Retina Reflex III and the fourth the Retina Reflex IV. Although this article deals with the care and servicing of the Retina Reflex III, it points out some of the features of the other Retina Reflex cameras as well.

The Retina Reflex was the least complex of the group. The Retina Reflex and the reflex models which followed it used a Compur 00-MXV shutter with an added mechanism to open the shutter blades for reflex viewing. All of the Retina Reflex cameras had built-in light meters as well.

In many respects, the Retina Reflex was a grown-up Retina IIIC; in fact the two cameras shared interchangeable front lens groups for 35mm and 90mm focal lengths.

There were two versions of the Retina Reflex; one version released the shutter and mirror at the same time; this depended upon the mirror and light-trap door moving out of the way before the shutter released. The second version used an interlock lever which held up the shutter release until the focal plane aperture was clear. The first version or "free running" camera was not imported into this country by Eastman Kodak. Some of those Retina Reflex cameras used Rodenstock optics. The U.S. version, however, used Schneider lenses, and the Rodenstock and Schneider lenses are not interchangeable.

Figure 2

In 1959 the Retina Reflex S was put on the market. The Reflex S was the first of the Retinas to have interchangeable lenses and Kodak produced a special bayonet mount for this purpose, Fig. 1. The Retina Reflex S also introduced a cross-coupled meter to the Retina line and may have pioneered the use of strings to provide that capability.

Like the S, the Retina Reflex III used the Retina bayonet mount for fully interchangeable lenses. The III introduced a meter that was not only cross coupled but also was visible in the viewfinder. The Reflex III also introduced the body-front release used on the Retina Reflex III and IV. Fig. 2 shows the Retina Reflex III and the S.

The final Retina Reflex was the model IV. Similar to the Reflex III, the IV deleted M sync and added shutter and diaphragm information to the viewfinder. It also used a new type of film counter. Previous Retinas used a subtractive counter which locked the film transport when frame #1 was reached; the camera operator had to

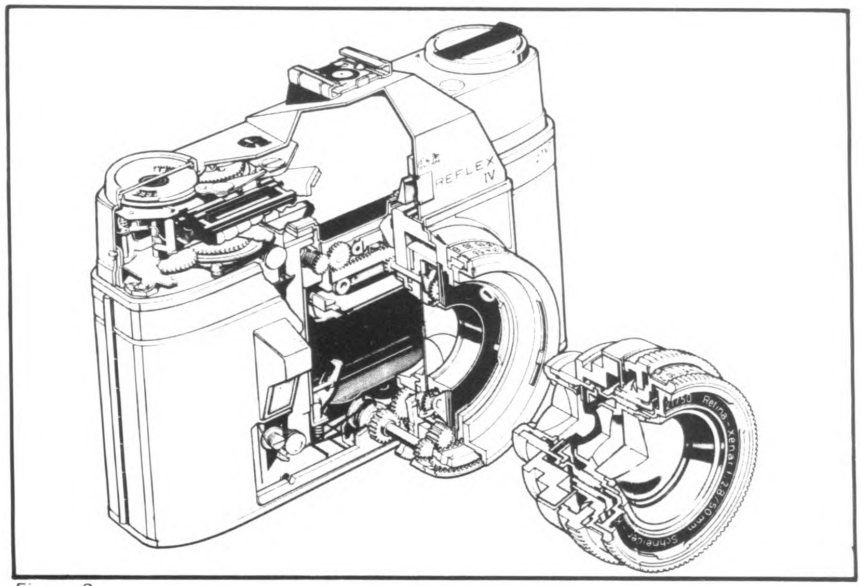

Figure 3 Drawing Courtesy Eastman Kodak

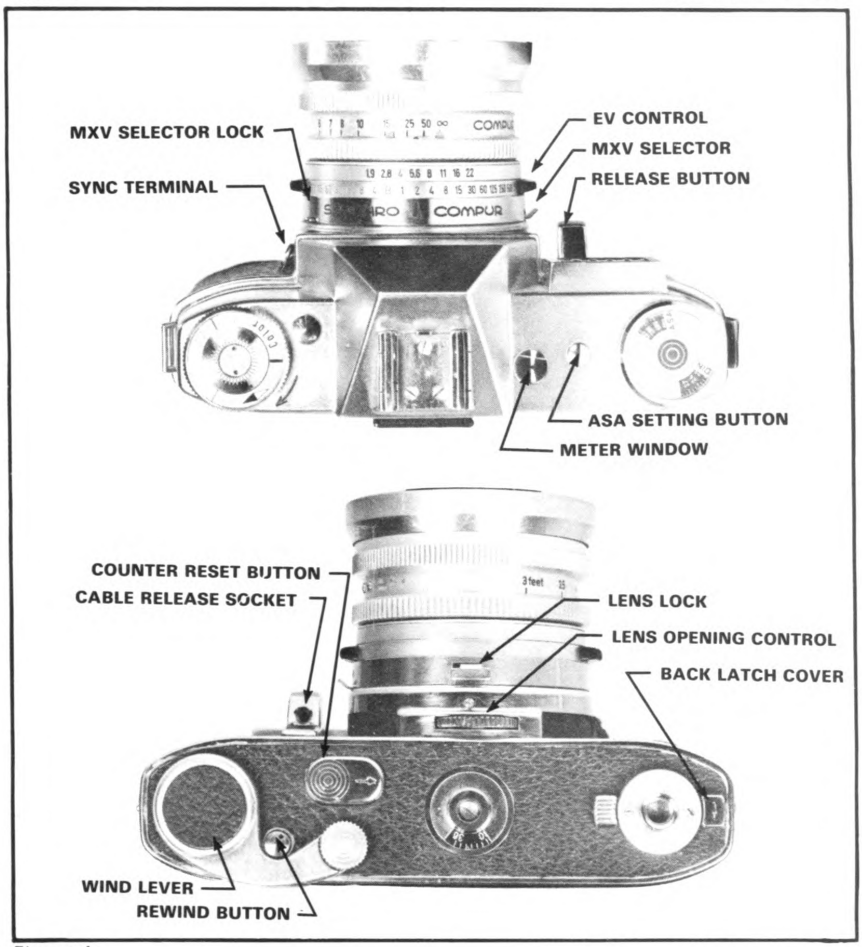

Figure 4

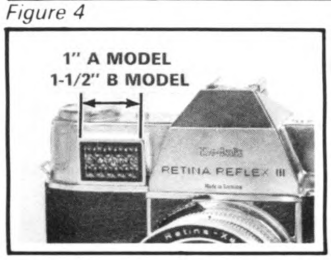

Figure 5

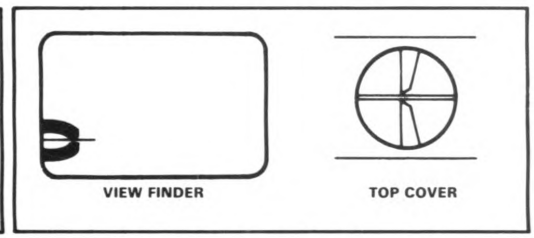

Figure 6

reset the counter before the transport would unlock. On the IV, the counter was additive and reset itself; it didn't lock the transport either. In Fig. 3 you can see a cut-away view of the Retina Reflex IV.

THE RETINA REFLEX III

This article isn't going to tell you everything that you need to know in order to repair a Retina Reflex III. Rather the intent is to provide you with an overview of the operation of the camera and with some hints which will make the repair of a Retina less trying. Retina Reflex cameras are not good cameras on which to learn camera repair. Retinas are fickle, and they will try your patience. The rapid completion of a Retina repair requires a great deal of experience with Retinas and a mechanic's feel for what is right.

Fig. 4 shows the location of the controls on the Retina Reflex III. The III was made in two models, the model we've illustrated is the A model. The difference between the cameras is the type of exposure meter used, Fig. 5. The A model has a small meter window and the ASA setting button is on the camera top; the B model camera has a slightly larger meter window and the ASA setting button is on the back of the top cover.

FINE POINTS OF OPERATION

Most of the Retina Reflex III's operation is reasonably conventional; however, there are a few points of operation which should be stressed because they are not standard.

The MXV selector lever has a lock which prevents the lever being pushed from its setting. Attempting to change the setting of the MXV selector lever without first pressing in the lock will result in damage to the shutter. When the operator selects V operation, the self timer runs down, and after the timer trips the shutter, the selector remains in the X sync position. On V operation, X sync is delivered.

Operation of the Retina Reflex III shutter controls and exposure meter is not hard. Rather than use a separate control for shutter speed, lens opening and film speed, the Retina has one control for lens opening and another control for EV (or LV, if you prefer). To change the exposure, use the EV control ring to set the shutter speed; as the shutter speed changes, the lens opening will also change, keeping the relative exposure the same. To change the exposure, use the diaphragm control to set the desired lens opening. To change the film speed, use the diaphragm control but hold down on the ASA setting button while rotating the control.

To set an exposure using the built-in meter, select an appropriate shutter speed and then rotate the diaphragm control until the meter needle centers in its index in the viewfinder, or on the top cover, Fig. 6.

DISASSEMBLY

Begin disassembly at the bottom cover. Remove the wind lever leatherette, retaining screws and then the wind lever. Remove the back-latch cover screws and the latch cover. Be careful in lifting off the latch cover because there is a spring inside the cover which keeps the cover over the back latch. Now, you can peel off the bottom cover leatherette and remove the bottom cover screws. Underneath the bottom cover there are two loose springs which you should locate and remove.

To remove the top cover from the A model, remove the rewind knob in the conventional manner and then remove the two screws beside the rewind shaft bushing. Remove the spanner-head screw from the top and the remaining screw on the meter-end of the top cover. Then lift off the top cover and immediately remove the ASA setting button.

Removing the top cover from the B model is similar as for the A camera except that the ASA setting button must be removed before the top cover may be removed. Unscrew the ASA setting button from the back of the top cover on the B. The button has a right-hand thread, so turn it counterclockwise for removal.

Once the top cover is off, the exposure meter decorative cover is loose so you will probably want to remove it.

The next step is to remove the exposure meter; this is a little tricky because the meter has a needle extending into the viewfinder and one of the meter screws is located so that it is hard to get to, Fig. 7. Once you've removed the meter, notice that one of the meter retaining screws is longer than the others. The long screw is the one which was hard to get to, it held the meter and the wind rack guide in place. If you want to operate a Retina Reflex III at this stage of disassembly or reassembly, you will have to use a top cover screw or other shorter screw to hold the guide down. Without the meter in place, the screw you removed from this position will reach too far into the camera body and interfere with the operation of the rear transfer shaft. Failure to anchor the guide will result in the cocking rack jumping out of engagement with the rear transfer shaft when the camera is wound. Gear-tooth damage will be the result.

Proceed to the front of the camera and remove the small piece of leatherette from the release button, the release button screw and the button assembly. Now, remove the front leatherette. You'll have to be careful when handling the leatherette because it is easy to tear. Also when the time comes to recement the leatherette, use a water-based adhesive because the leatherette is dissolved by the more popular, petroleum-based solvent adhesives used in camera repair. (Some technicians use white glue for this purpose, while a large group prefers Carter's Glue Stick.)

The chrome trim around the top cover is still held to the body by two screws going into the front standard. For most Retina Reflex repairs you'll have to remove the front standard, so the screws will have to come out.

Now remove the four screws holding the front standard and lift off front standard. In addition to holding the front standard in place, the front standard retaining screws also retain the cup-shaped spring washers used to adjust the position of the front standard for correct back-focus distance. With the front standard removed, the washers can move freely. To prevent losing the washers and to hold them in place during reassembly, use a little non-hardening adhesive. The three washers used in each location should be installed so that two concave and two convex sides face each other. Don't be alarmed if you hear a spring unraveling as you remove the front standard. The initial tension on the front-transfer-shaft spring is coming off. You'll

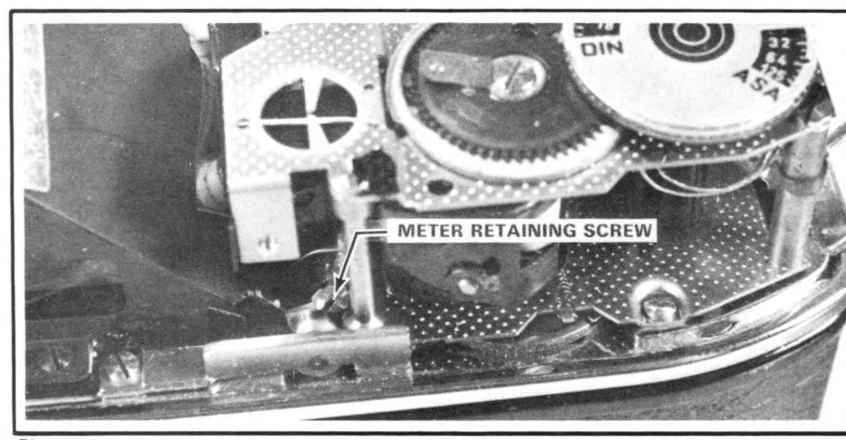

Figure 7

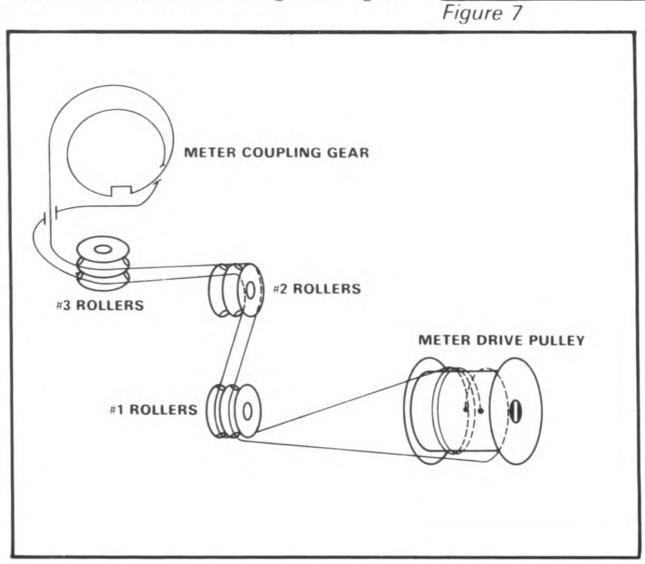

Figure 8

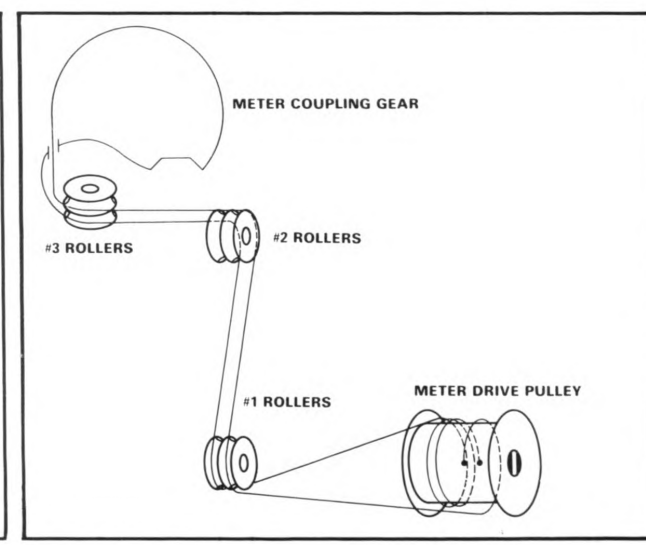

Figure 9

have to reset the tension on this spring during reassembly, but that is not hard to do.

Removing the front standard reveals the meter linkage in the camera body, and also uncovers the reflex viewing mechanism on the back of the front standard. Let's look at the meter linkage first.

Figs 8 & 9 show the routing of the meter drive cord which links the EV mechanism in the shutter to the exposure meter at the top of the camera body. Two meter cords have been used on the Retina Reflex III, however, only the second shorter cord is available now. If you replace a meter cord, use the routing shown in Fig. 9. It is worthwhile to note that there are two cutouts in the meter drive drum. The straight cutouts were used with the discontinued cord which was thinner than the current one. Use the angled cutouts for the new cord.

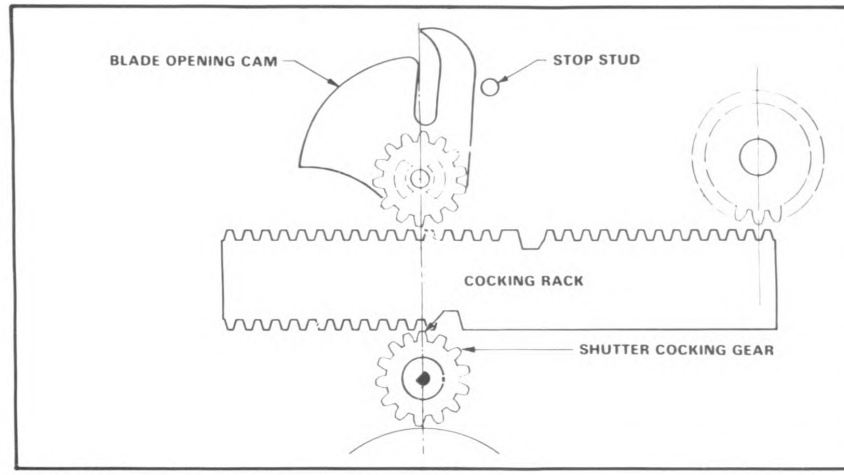

Figure 10

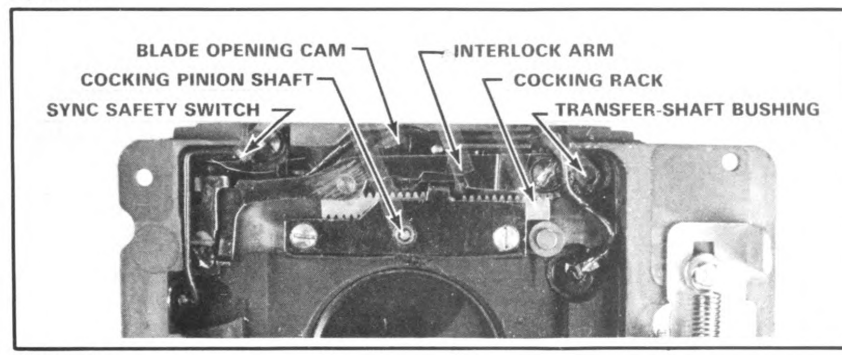

Figure 11

THE REFLEX VIEWING MECHANISM

In order to open the shutter blades for viewing, the Reflex III uses a blade opening cam to move the blade operating ring. Unlike the Compur Wide Reflex shutter shown in NatCam's Manual 328, the blade opening cam in this Retina is coupled to the cocking pinion motion through a drive gear, rather than being directly on the cocking pinion shaft. (The shutter shown in NatCam Manual 328 is the shutter used on the Voigtlander Bessamatic, a contemporary of the Retina Reflex III.) Fig. 10 shows the relationship of the blade opening cam and its drive gear to the cocking rack and shutter wind gear. You'll need to duplicate this relationship upon reassembly.

Because the blade opening cam moves the blade operating ring and the blade operating ring operates the sync contacts for X sync, there must be a sync safety switch in the sync circuit to prevent a flash from firing when the shutter blades are open for viewing. Since the operation of the safety switch is directly linked to the reflex action of the Retina Reflex III, incorrect operation here must be detected and corrected if the repair is going to be completed. Let's examine the operation of the reflex viewing mechanism.

In Fig. 11 the shutter is shown at rest in the released state. To cock the shutter, the wind lever couples through the cocking linkage, Fig. 12 and pulls the cocking rack from left to right. This cocks the shutter and opens the shutter blades for viewing. At the same time this allows the interlock arm to drop into the path of the cocking rack. Power for the interlock arm is provided by the sync safety switch contacts which open as the interlock arm is pushed down. So, when the shutter is

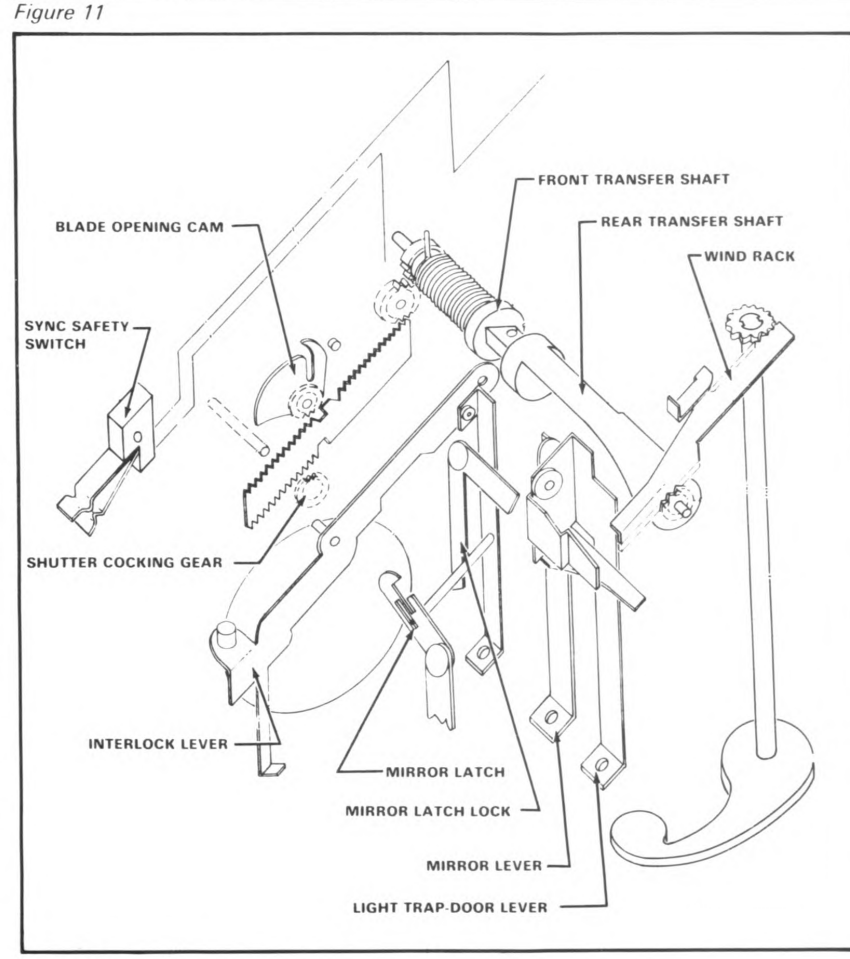

Figure 12

cocked and the shutter blades are open for viewing, the sync safety switch is open.

When the shutter is cocked, the cocking rack is held toward the right until the shutter is released. Then when the shutter is released, the rack moves quickly toward the left until it is stopped by the interlock lever. The interlock lever carries a pin on its back side which holds the rack and so stops the shutter with the shutter blades closed; the shutter now is in the cocked state with the blades closed. Freeing the cocking rack will allow the exposure to be completed. So, something must move the interlock lever before the exposure cycle is complete.

The part which moves the interlock lever is the light-trap door. The light-trap door has been blocking off the film plane and protecting the film from exposure while the shutter was open for viewing. When the light-trap door strikes the interlock lever, the shutter is closed so the sync safety switch may be closed and the exposure completed.

While the shutter was open for viewing, the camera shutter provided the latch to hold the camera cocked. Because holding the camera cocked places stress on the cocking-ring latch in the shutter, cleaning and lubricating the shutter is a top priority. Any shutter problems will be magnified by the long cocking and release linkage into a major camera malfunction.

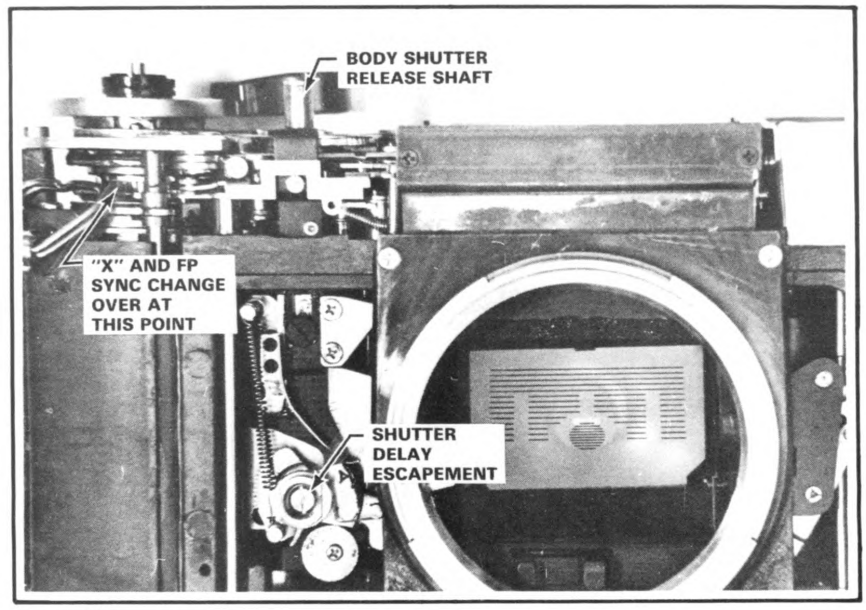

Figure 13

When the reflex viewing mechanism and the shutter are operating correctly, the reflex viewing mechanism will run through under the power provided by the cocking-ring spring in the shutter. The mechanism is driven through by a spring, but even with the spring assist, the mechanism must operate on its own first if the camera is to perform with reliability.

To test the operation of the reflex viewing mechanism, remove the front and rear transfer shafts and use them to cock the shutter. Be sure that the shafts are perpendicular to the front standard so that you avoid damaging the shaft pivot.

Now, trip the shutter and watch the action of the cocking rack. The rack must move quickly to the point where it is halted by the interlock lever. When the rack stops, the shutter blades must be closed. Lifting the interlock lever out of the way should allow the shutter to finish its cycle. If you have to give the rack any help or if it hesitates or moves sluggishly, you will have to determine why, so that you can correct the probiem. Since this is such an important part of the Retina Reflex III's operation, check the Servicing Notes section of this article for more detail.

OPERATION OF THE MIRROR AND LIGHT–TRAP DOOR

Key to the operation of the mirror and the light-trap door is the action of the transfer shafts. During the cocking of the shutter, the rear transfer shaft rotates and that rotation is being converted to linear motion through the cam surface of the shaft and the levers on the side of the mirror cage. These levers, the light-trap-door lever and the mirror lever lower the light-trap door and the mirror, respectively. A cam surface on the front transfer shaft opens the mirror latch so that the light-trap door can pass and the mirror can drop into the latch. When the mirror reaches the latch, a pin on the side of the mirror frame trips the latch to hold the mirror.

To release the mirror, the cammed surface of the front transfer shaft rotates and trips the mirror release lever. This is the same lever that held the mirror latch out of the way during cocking. As the mirror rises, it unlatches the light-trap door, Fig. 13. A secondary latch on the door is operated by an extension on the release lever. The secondary latch spring was one of the springs which was loose once the bottom cover of the camera was removed.

It is possible to operate the film transport with the transfer shafts in place and the front standard removed; don't do it! Rotating the transfer shafts without the front standard in place to act as a bearing will allow the shafts to wobble while turning; this will bend the levers on the mirror cage and may damage the rear-transfer-shaft pivot. Replacing the light-trap-door slide and the mirror slide is a time-consuming operation. Replacing the entire body because of a shot bearing point for the rear transfer shaft is very expensive. So, don't operate the camera without the front standard unless you remove the transfer shafts first.

Thanks to Mike Lowe of Rocky Mountain Camera Repair, Denver, Colorado, and Val Juchna, a former NatCam instructor for their help in researching this topic.

Continued next issue

THE ENIGMA OF THE RETINA REFLEX

Part II by Chris Dowden

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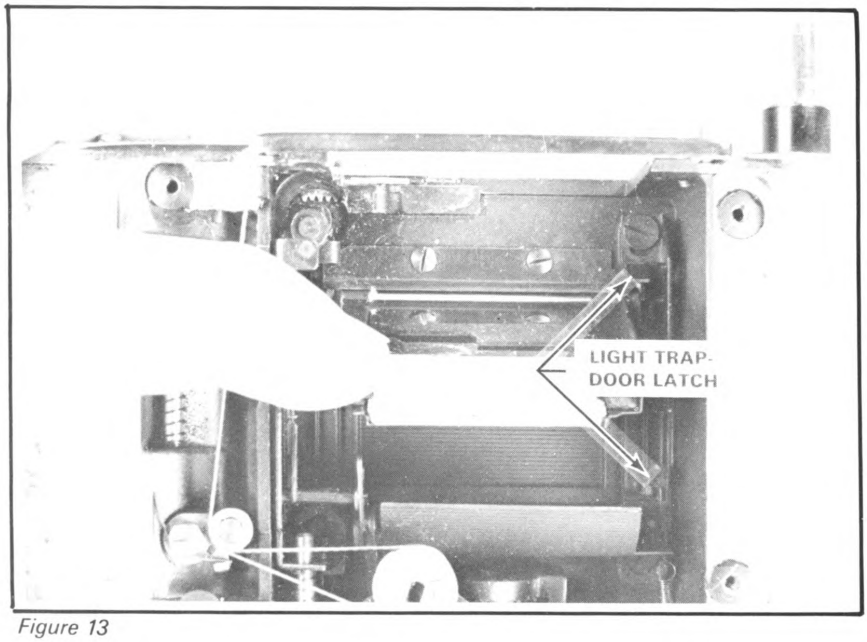


Figure 13

REMOVAL OF THE SHUTTER

Because the shutter plays a very important part in the operation of the Retina Reflex, let's spend a little time on remov-

ing, cleaning and lubricating the shutter.

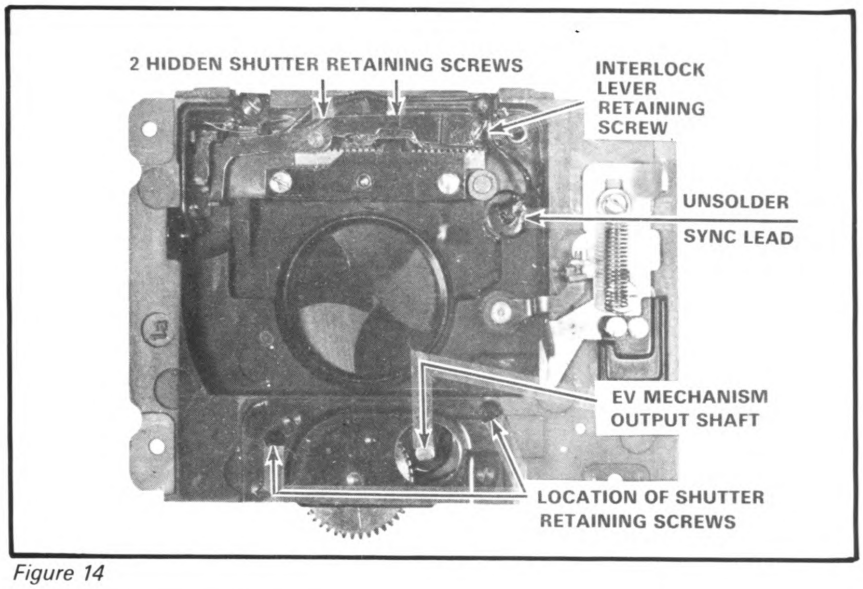
Two of the shutter retaining screws are hidden behind parts of the reflex viewing mechanism, so the reflex viewing mechanism must be removed in order to remove the shutter for cleaning. In addition, one lead to the sync safety switch must be unsoldered before the shutter is removed, Fig. 14.

Begin by removing the screw which anchors the interlock lever and gear below it. This screw will be very tight, so press down firmly while turning so that your screwdriver doesn't slip out of the screw slot and damage the screw head. When the time comes to replace the screw, it should be replaced so that it won't work out while the camera is in use; a thread-locking agent is appropriate for this purpose. You can also put the screw in tight, but remember that you are installing a steel screw in an aluminum housing and there is a point at which the threads in the housing will strip out. Lift off the interlock lever and gear. There is a small bushing within the gear which may drop out of the gear during handling, look for it.

Remove the two screws holding the cover over the cocking rack, then lift out the cover, the rack and two bushings used to support the cover and guide the rack.

Now, carefully remove the spring which holds the blade-opening-cam gear and the blade-opening cam in place. Look for small washers as soon as the spring is out of the way, there may be washers located above the gear and also below the cam. Be sure to replace the washers during disassembly.

Now you are ready to remove the shutter. Remove the four shutter-retaining screws and lift the shutter from the standard.



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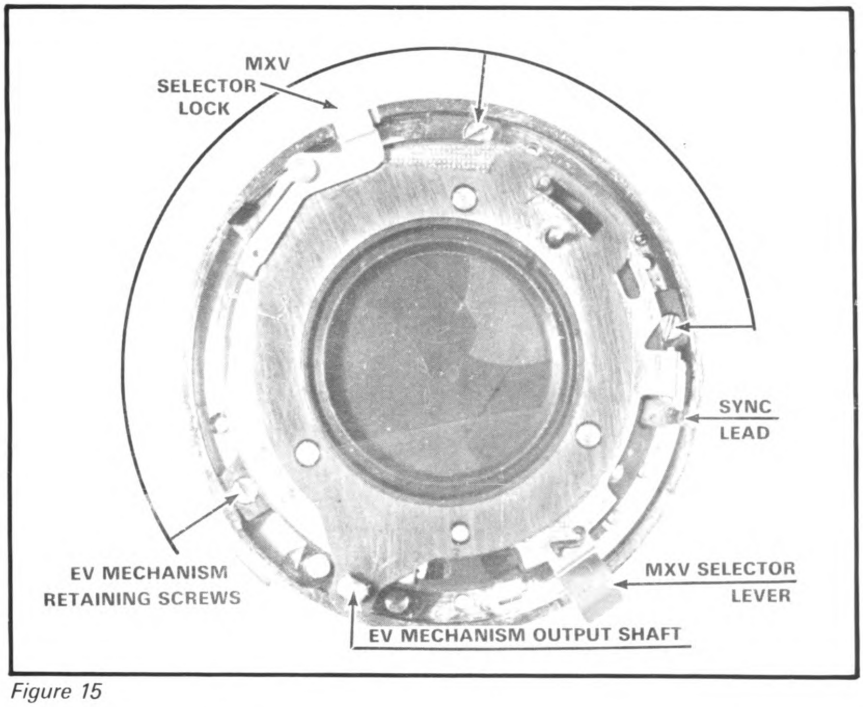

Figure 15

CLEANING THE SHUTTER

Three screws hold the shutter to the EV mechanism, Fig. 15. Remove the shutter from the EV mechanism while watching for the ball detent used to index the shutter speeds. Now, you can use your favorite cleaning method on the shutter — flush cleaning or complete disassembly for hand cleaning of the individual parts or a combination of the two techniques — whatever works for you. Just be certain that when you are done, that the shutter is spotlessly clean.

As part of the cleaning procedure, you should remove the mainspring for inspection. A good mainspring will have its ends at 12 and 3 o'clock; on a bad mainspring, the ends are more separated, Fig. 16. Since a weak mainspring will result in shutter-speed error, it makes sense to replace a bad spring now, rather than waste your time trying to adjust the shutter later.

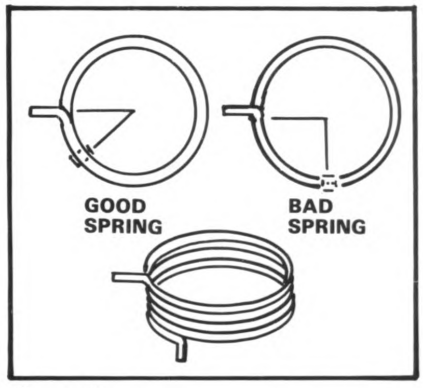

Figure 16

Even if you flush clean the shutter, you should remove the lens flange and blade operating ring for hand cleaning. This is easier than it sounds and requires only reasonable care to prevent the shutter blades from scattering. You'll find that the disassembly and reassembly for this cleaning operation is easier if you remove the detent spring which acts on the blade-operating ring. The detent spring is located a short distance counterclockwise from the main drive cam and against the mechanism plate.

Clean the blade operating ring and its bearing surface on the lens flange until you can remove no more dirt — be very careful not to bend the blade-operating ring during cleaning.

LUBRICATION IN THE 00-MXV

The Compur 00-MXV shutter requires a different approach to lubrication than a more recent Japanese shutter might. The use of the right lubricant in the right quantity and in the right place is essential to dependable operation.

All of the latches on the blade operating ring and all of the latches operated by the blade-operating ring must be greased with a high-quality instrument grease. However, do not grease the bearing surface for the blade operating ring on the lens flange.

Besides greasing the latches, be sure to grease the remaining bearing points including the main drive cam pivot, the cocking pinion bushing, the opening and closing studs on the blade operating ring, the latch for the main drive cam on the inner release lever, the retard lever on the speeds escapement, the inner circumference of the cocking ring and all of the cocking ring latching and bearing points. Also grease the detent spring where it contacts the blade operating ring.

Missing lubrication points in the Compur shutter will result in problems which won't go away until the shutter lubrication is complete.

CLEANING THE EV MECHANISM

To separate the EV mechanism for cleaning, remove the three screws from the lens flange side of the mechanism, Fig. 17. The screw in the 7 o'clock position may be longer than the other two; be sure to replace it in the correct position.

Once the EV mechanism is free of the shutter, the shutter speed setting ring may be lifted off. After you do this, remove the two black plastic "ears" from the ring to prevent their being damaged during cleaning.

Now, separate the rest of the EV mechanism and clean the individual parts.

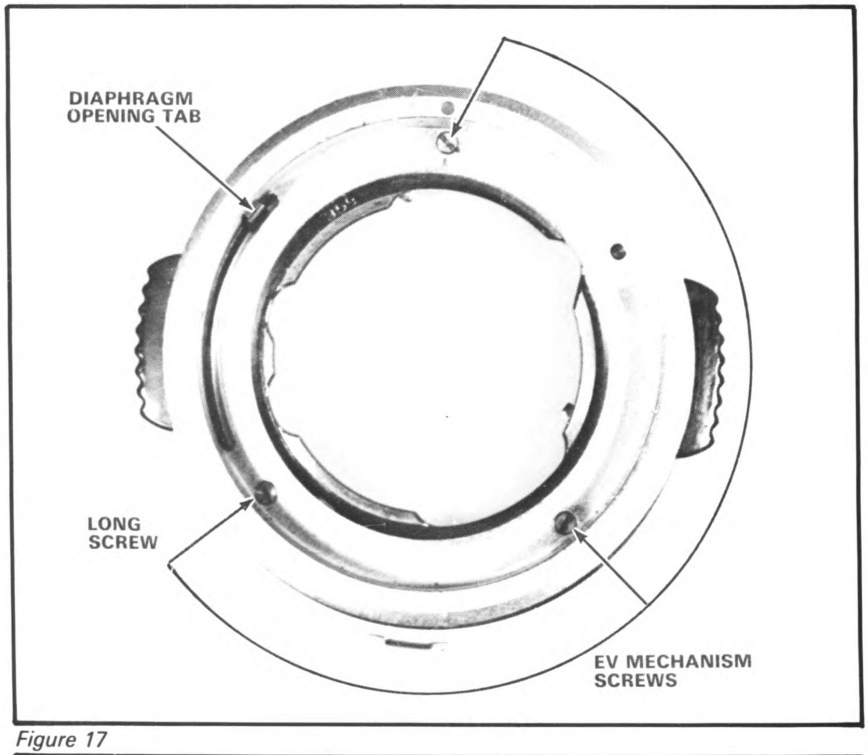

Figure 17

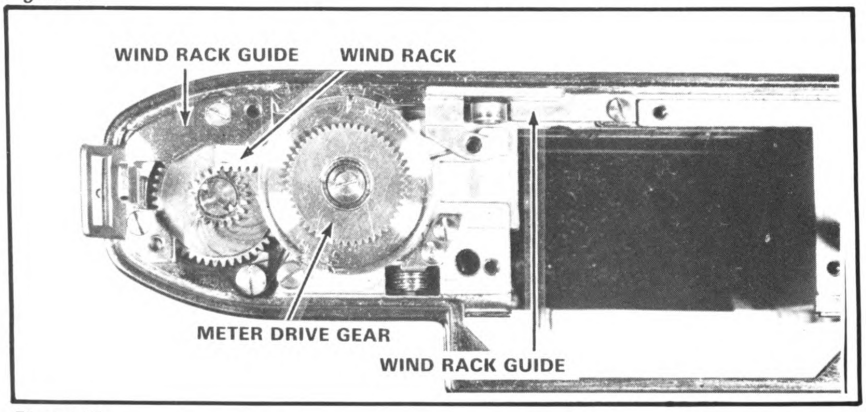

Figure 18

Reassemble the EV mechanism without lubrication.

With the shutter and EV mechanism ready for reassembly, you have more than one reassembly procedure open to you. You can reinstall the EV mechanism and then mount the shutter on the front standard, or you can hold off on the addition of the EV mechanism to the shutter until after the shutter and front standard are on the camera. Many technicians prefer the second reassembly method because it simplifies adding the front standard to the camera body.

SERVICING THE TRANSPORT

It is very easy to become convinced that problems in a member of the Retina Reflex family originate in the transport, although this is seldom the case. Often, binding in the wind or wind return is the result of drag associated with the reflex viewing mechanism or the rear transfer shaft. Nevertheless, there are times when transport service is necessary.

To remove the transport parts for cleaning or repair, first remove the meter drive gear, Fig. 18. Then, remove the wind rack guides also shown in Fig. 18. Lift out the wind rack and examine it for damage. You should not find any broken or bent teeth on the wind rack.

If you reinstalled the wind lever for operating convenience, remove it now. Then remove the wind shaft by unscrewing the spanner-head screw which holds the first wind gear to the top of the shaft, Fig. 19. Look again at the bottom of the camera and rotate the wind key until the screws which hold the wind shaft assembly are visible, Fig. 20. Remove these screws, then remove the wind shaft from the bottom of the camera. You'll have to hold the rewind-button latch and the transport ratchet lever out of the way while you are doing this.

Notice that the wind shaft has a return spring made up of relatively few turns. Because of this, the spring is easily damaged. Putting too much initial tension on the spring, or putting the initial tension on backwards, invariably damages the spring — which is available only as a part of the complete wind shaft assembly.

The wind shaft usually operates best when lubricated with a slightly tacky, lightweight grease. Plastilube #1 which is made by the Warren Refining and Chemical Company is available in small quantities from the Eastman Kodak Company.

Removing the wind shaft freed the sprocket coupling gears at the top of the wind shaft. Fortunately, there is no critical timing involved with the reassembly of these parts. As long as the

parts are assembled in the correct order, they will time themselves.

Before replacing the wind shaft gear and the other transport parts, you'll have to replace the wind shaft and add initial tension to the wind shaft return spring. Refer to Fig. 21 for the initial position of the wind shaft. From the initial position, add 1-1/3 turns of tension to the wind shaft spring as shown. If 1-1/3 turns is not enough tension to return the wind lever, there is binding in the mechanism. Adding 1/3 turn of additional tension may overcome the problem, but it will make the wind difficult to turn. Adding 2/3 of a turn of additional tension will result in spring damage when the camera is wound.

REPLACING THE SHUTTER

There are two important considerations involved in replacing the shutter: properly engaging the release lever on the shutter with the release linkage on the front standard, and routing the sync contact so that it does not short out against the camera body. You can check the operation of the release linkage to determine if the lever and linkage are engaged properly. Since the shutter provides the spring action for the return of the release lever and linkage, the linkage won't return unless the lever and linkage are engaged.

When replacing the sync lead, route it through its cutout so that it doesn't touch the body. Usually there is an insulating washer over the cutout to keep the lead from shorting out. You'll want to glue this washer in place so that it continues to perform its intended function.

With the release linkage and sync lead accounted for, add the shutter retaining screws and tighten them evenly. Stop if the shutter isn't seating freely and evenly. Failure of the shutter to seat is most often caused by the release lever and linkage not engaging, so check this if the shutter springs back as you try to seat it.

Once the shutter is in place, add the reflex viewing parts which you removed earlier — including the cocking rack, interlock arm and blade opening cam and their related parts. Remember that the screw which holds the interlock arm down must be tight.

The front standard, shutter and reflex viewing mechanism must operate correctly before you can consider adding the front standard to the camera body. If the viewing mechanism operates with hesitation or not at all, there are some common problem areas you can check. First clean the reflex viewing mechanism completely ...yes, clean it again. Then try the operation again. If that doesn't work, remove the reflex viewing mechanism parts and

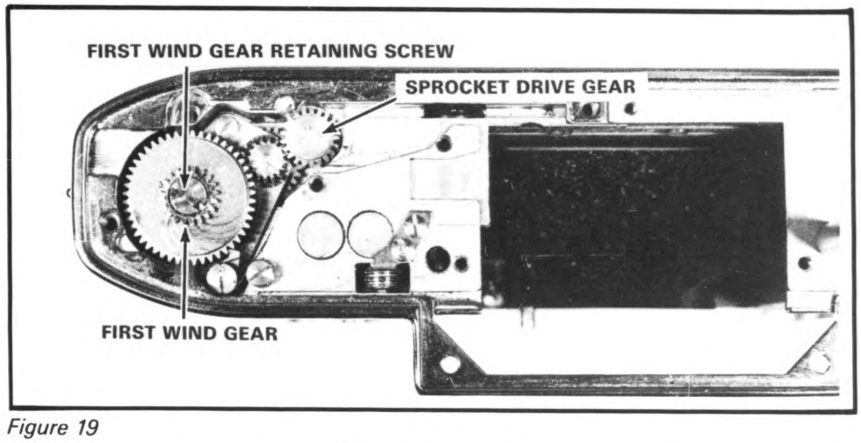

Figure 19

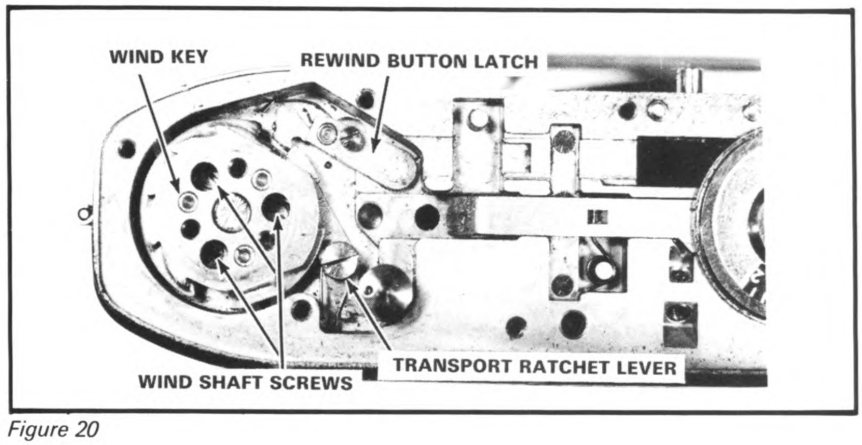

Figure 20

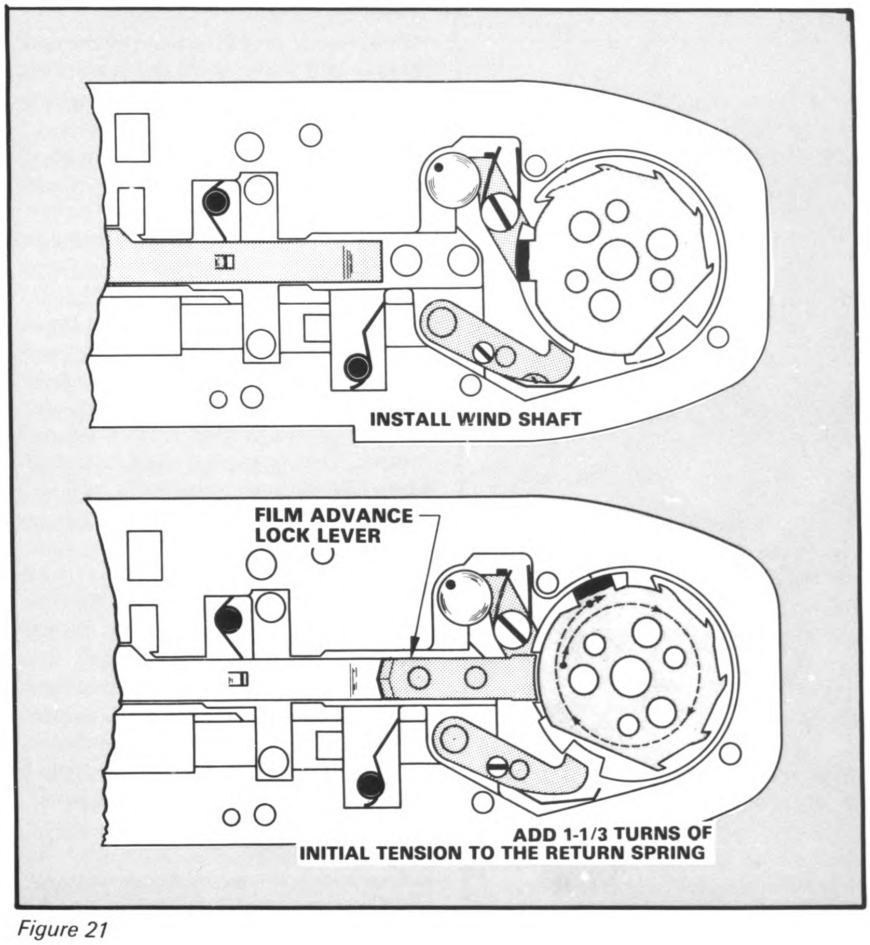

Figure 21

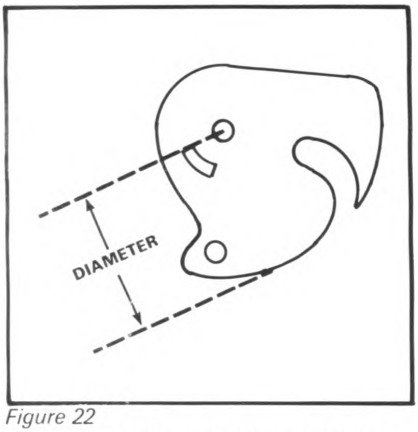

Figure 22

Diameter varies from 5.24mm to 5.50mm in .05mm increments

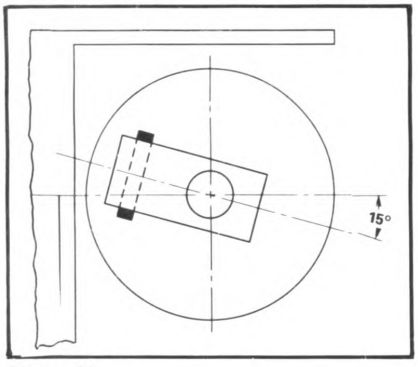

Figure 23

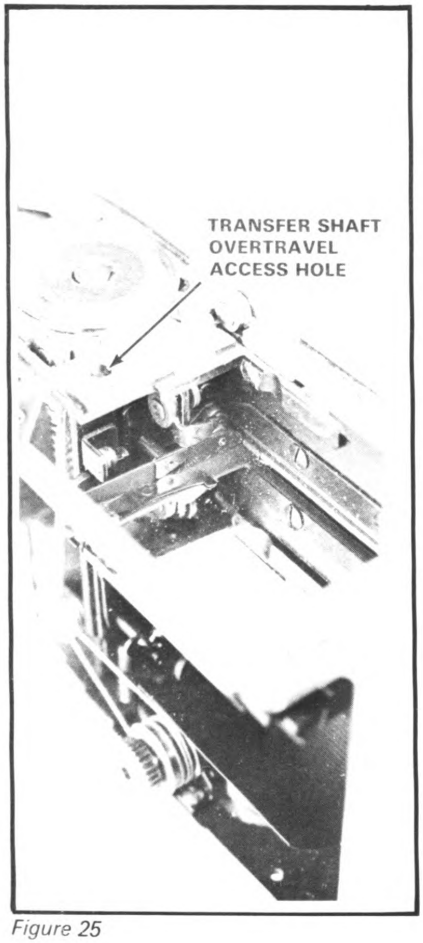

Figure 25

wipe them with wet moly grease which has a high percentage of molybdenum disulfide in it. Then wipe the parts dry and replace them. You can also try operating the mechanism wet — that is using a liberal amount of grease for lubrication, leaving it in the mechanism. A lightweight instrument grease is suitable in this area. A few technicians resort to using oil in the reflex viewing mechanism; this practice can be dangerous since oil can travel the short distance to the shutter blades easily.

The cocking rack is one of the more common problem parts in the Retina. If its teeth become bent or stretched, the rack will bind. Sometimes you can take a small amount off of the teeth of the rack to overcome this problem. If the modified rack works, replace it with a new one before the old rack fails again.

Another area where binding occurs is between the blade opening cam and the blade operating ring. Since this is a common problem, Kodak makes several blade-opening cams available. These cams have a different diameter, Fig. 22, to allow for free passage of the blade operating ring. Remember, as you are considering this as a problem area, wear increases the spacing between parts and that the camera worked when it left the factory. That is to say, the pin on the blade operating pin wasn't bent, is now, and needs to be straightened to eliminate the problem.

Binding can also result from the blade opening cam spring being too tight or from the spring, cam or gear having developed a burr. You can bend the spring slightly to decrease the tension on the cam and gear; however, if you reduce the tension too much, the gear and cam won't stay in engagement and the symptom will be that the shutter blades either don't open fully for viewing, or don't close fully before the exposure. To remove a burr, use a hard Arkansas stone to polish the spring, gear, and cam as is necessary.

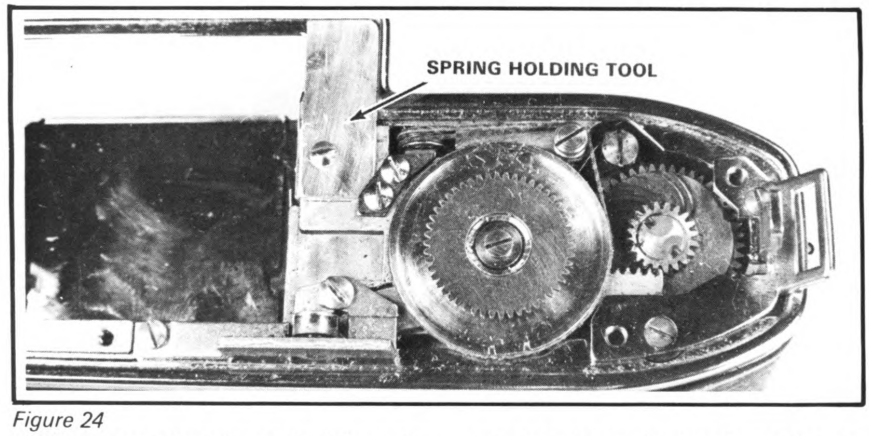

Figure 24

Also, if you used a locking agent to hold the interlock lever retaining screw in place, there is a chance that locking agent worked its way into the bearing and froze the bushing to the screw. A complete cleaning of the screw, gear and bushing in acetone should remove any traces of locking agent. To prevent a re-occurence of this problem, use a minimum of locking agent and apply the agent to the threads in the hole — not to those on the screw.

RESTRINGING THE METER CORD

Although the meter cord does not have to be unhooked in order to remove the shutter from a Retina Reflex III, the meter cord may hop off of its pulleys or guides and so require restringing. For a reference to the proper routing for the meter cord, refer to Fig. 9 in part one of this article.

When you are rehooking the meter cord, you must make sure that the cord does not wind onto itself while traveling on and off of the meter drive pulley. Also, make sure that the cord is not twisted, as a twisted cord will tend to walk off of the meter drive pulley.

When you add the front standard with the EV mechanism in place, the meter coupling gear and the meter drive pulley should be positioned as shown in Fig. 9 to properly engage the output shaft from the EV mechanism when the EV mechanism is set to f/1.9 and B.

REPLACING THE FRONT STANDARD

Once you are satisfied that the shutter and reflex viewing mechanism are operating correctly, you may add the front standard to the camera body.

Begin this procedure by replacing the front and rear transfer shafts. The rear transfer shaft goes in first and it should be located so that its drive key lines up at 15° to the horizontal, Fig. 23. Then, the front transfer shaft goes in. The spring on the front transfer shaft needs a turn of initial tension if it is going to drive the reflex viewing mechanism through quickly. To hold that tension during the remaining

steps of replacing the front standard you may want to make a tool to hold the spring in place, Fig. 24. Exact dimensions aren't given for the tool — if you are ready to work on a Retina Reflex, you shouldn't need instructions on how to cut a piece of brass.

To get the front standard into place, you will have to do a number of things at once: The transfer shafts and the pinion on the front transfer shaft must be lined up with the bushing in the front standard without losing the initial tension on the front transfer shaft spring; the mirror must be pressed down slightly so that the front standard will fit into place; the release lever extension must pass between the mirror latch lock and the side of the mirror cage without unhooking the mirror latch lock spring; and if the EV mechanism is in place, the meter pulley must engage the EV output shaft from the shutter. You'll have to lift up slightly on the chrome trim ring around the top of the camera while doing this or the front standard won't clear. This isn't nearly as hard as it sounds — after a few tries, anyhow.

TESTING THE FRONT STANDARD ASSEMBLY STEP

The reassembly step immediately following adding the front standard to the camera body is testing the preceding step. To do this, you will need to add the wind lever and the winding rack guides. Also, add all four of the front standard retaining screws and snug them down so that they are tight. Trip the transport latch by pressing the release button, then wind the camera very gently. The use of a *very light touch* is important in this step because forcing the camera when something is sticking is going to break parts. More often than not, a problem which turns up during this check out is the result of a timing error in reassembly, so if a problem develops, check the timing of the wind rack, the cocking rack and related wind and transport parts.

When the shutter is cocked, allow the wind lever to return slowly so that you can check for sticking in the wind lever return. Sticking is often the result of lubrication or the lack of it somewhere in the transport. Some transports work best with a little lubrication, some need a lot of lubrication. The critical points in the transport are: the wind shaft bushing, the interface between the front and rear transfer shafts, the cam surface on the rear transfer shaft, the track that the cocking rack rides in, the wind ratchet where it contacts the wind cam and the body bushing for the ratchet on the wind shaft.

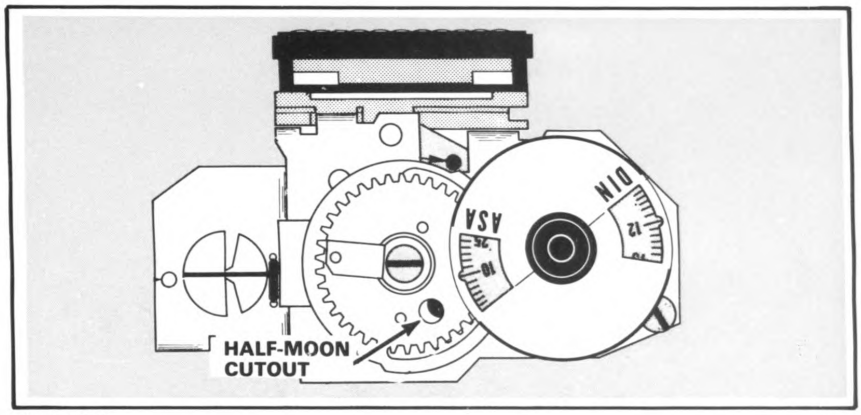

Figure 26

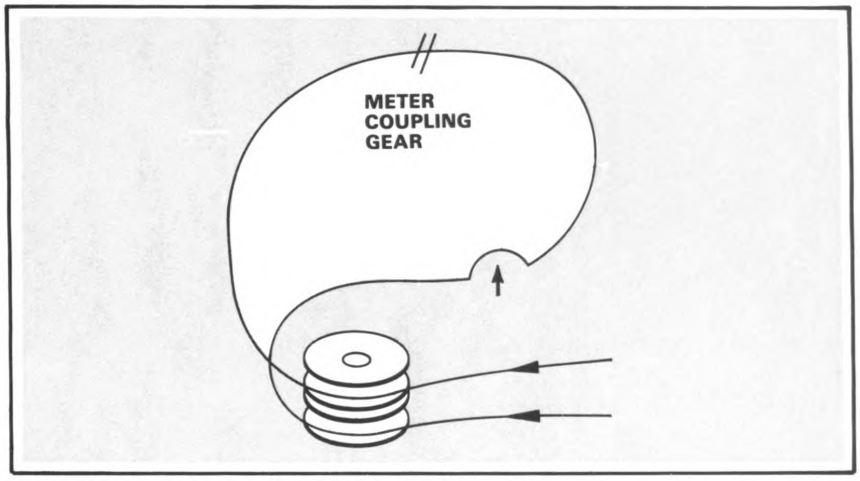

Figure 27 Cutout faces front of camera at ASA 10

As soon as you have the transport working smoothly on both wind and return, you are ready to continue with reassembly.

COMPLETING THE BOTTOM OF CAMERA ASSEMBLY

Now that you have the shutter and transport working correctly, you should adjust the wind overtravel. To do this you will have to replace the bottom cover, so remove the wind lever and then add the bottom cover plate, but do not add the bottom cover leatherette.

Now, replace the wind lever and cock the camera. Trip the shutter and watch what happens. The shutter should run through a normal exposure cycle. The shutter's operation is easier to see if you use a slow shutter speed or B for the test. In some cases, the shutter won't complete the exposure cycle. Rather, it will close down but not reopen for the exposure. If this happens, the shutter delivers a partial cycle, and you'll have to increase the overtravel of the front transfer shaft.

The overtravel adjusting screw on the front transfer shaft is accessible through a small hole in the top of the camera body, Fig. 25. Turn the adjusting screw in until the shutter cycles through correctly, then apply locking paint to the adjusting screw to prevent the adjustment from drifting.

ADDING THE VIEWFINDER AND METER

The viewfinder assembly must be added before the meter assembly. Add the viewfinder and fasten it into place, then add the meter.

To time the meter properly for reassembly, refer to Fig.26. Notice that the meter is set to ASA 10 and that a half-moon shaped cutout is visible in the round hole on the top meter gear. At the same time, the cam follower for the meter should be in the meter off position where the cell output is shorted through a closed switch. The meter is now correctly timed for reassembly with the camera when the meter coupling gear is set so that the cutout which anchors the meter string is facing the front of the camera, Fig.27.

Now, slip the meter into the camera body so that the meter coupling gear engages the bottom drive gear on the meter and the lower meter needle reaches into the viewfinder. Add the meter retaining screws and the meter installation is complete.

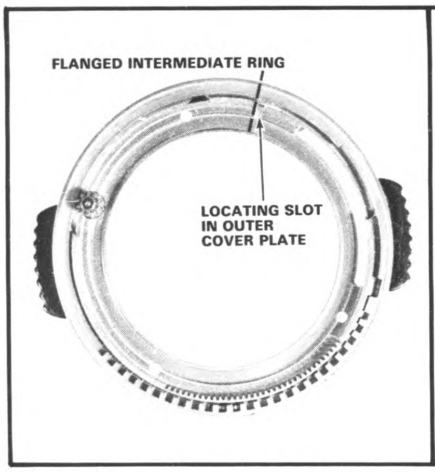

Figure 28

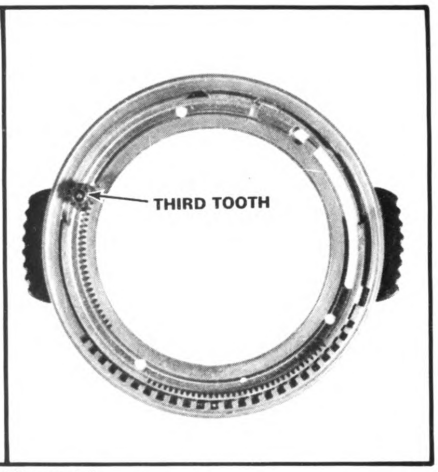

Figure 29

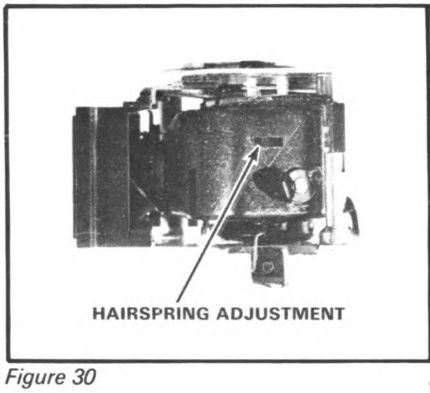

Figure 30

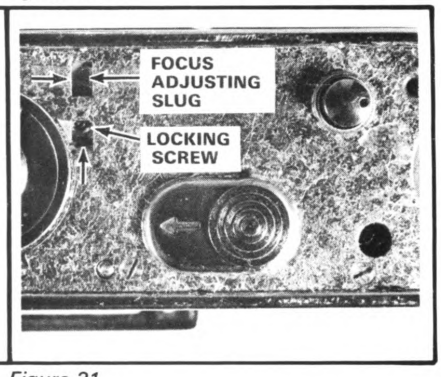

Figure 31

ADDING THE EV MECHANISM AND ADJUSTING THE METER

You have probably left the EV mechanism off of the shutter; if so, now is the time to install it.

Place the EV mechanism face down and time it so that when the shutter speed and diaphragm opening indicators line up with their index, they do so at B and f/1.9. At this time the flanged intermediate ring should line up with the cover plate as shown in Fig. 28. When the EV mechanism is timed correctly, add the diaphragm opening ring so that the third tooth in the ring lines up with a line through the center of the pinion which drives the ring, Fig. 29.

Now add the EV mechanism output shaft and gear to the camera body. Since you have already timed the meter string and other meter linkage, there is no special timing procedure to be followed when replacing the output shaft. Just install it so that it engages the meter drive pulley, and replace the output gear.

With the shutter set on B, carefully add the camera body and shutter to the EV mechanism. Completing this step requires a sensitive touch to get the EV mechanism seated properly. The trick is to get the EV mechanism to engage the speed cam tab coming from the shutter. Adding the retaining screws for the EV mechanism completes the reassembly of this portion of the camera.

The addition of the EV mechanism allows you to check the operation of the exposure meter using a light source of known intensity. To make slight corrections in the meter deflection, insert a small tool into the cutout in the end of the galvanometer housing and adjust the hairspring tension and thereby the meter needle position, Fig. 30.

Errors which can't be corrected using this procedure indicate either a timing error in the meter linkage or a meter malfunction. You can correct a timing error; however, a bad meter will probably have to be replaced.

ADJUSTING COLLIMATION AND VIEWFINDER FOCUS

Since the front standard has been removed from the camera, the lens-to-film distance must be readjusted. In addition, the viewfinder focus should be checked.

Using a method of your choice, adjust the focus on the film plane. Of course this will be done with the shutter open on B. The adjustment for the lens-to-film distance is made by loosening or tightening the front standard retaining screws. Usually, fully tightening all four screws will bring collimation in.

After the lens-to-film distance has been set correctly, check the focus on the viewing screen. If the focus needs correcting, use the mirror angle adjustment on the bottom of the camera, Fig. 31. You'll need a 1.7mm screw about 7 or 8mm long to fit into the adjusting slug. Install the screw, then loosen the locking screw on the slug and use the screw you installed to slide the slug until proper viewfinder focus is achieved.

FINISHING THE REPAIR

Well, that about wraps up the tricky stuff. The remainder of the reassembly involves adding the top cover, leatherette and other external parts.

While this article has covered some aspects of the repair of the Retina Reflex in detail, it has been skimpy on other aspects. This is because the emphasis has been on providing information about those aspects of the Retina that make it more difficult to repair than many contemporary cameras. Since the Retina Reflex is to camera repair what the automatic transmission is to automobile repair, the novice repairman is advised to gain a little experience with the fundamentals before attempting to deal with the many unconventional ways of doing simple things in the Retina.